

The current flowing past a point in a wire is described by the expressions given below for different situations. For each case, find the total amount of charge that has flowed past the point in the time interval between 0 and 1.5 s. How many electrons does that represent? ( $N$  is the number of electrons.)

a)  $i(t) = 1.5 \text{ mA}$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

b)  $i(t) = (4 \text{ A/s})t + 2 \text{ A}$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

c)  $i(t) = (10 \text{ mA}) \exp\left(\frac{-t}{2 \text{ s}}\right) + (5 \text{ mA/s}) \cdot t$

$Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

d)  $i(t) = (2 \text{ A}) \sin\left(\frac{2\pi}{3 \text{ s}} \cdot t\right)$  :  $Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

e)  $i(t) = (50 \text{ mA}) \cos\left(\frac{2\pi}{0.75 \text{ s}} \cdot t\right)$

$Q =$  \_\_\_\_\_;  $N =$  \_\_\_\_\_

Write your answers — and whatever work will fit — on this sheet. Staple any sheets with additional work behind.